FIG. 1

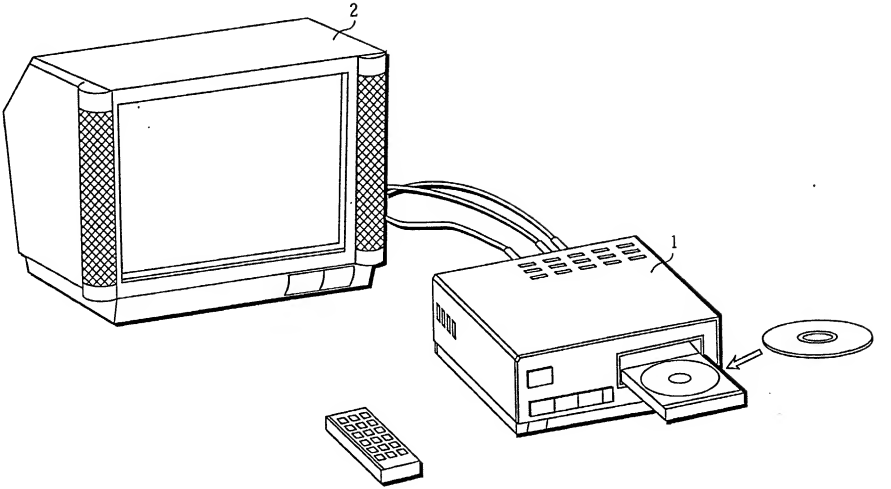


FIG. 2

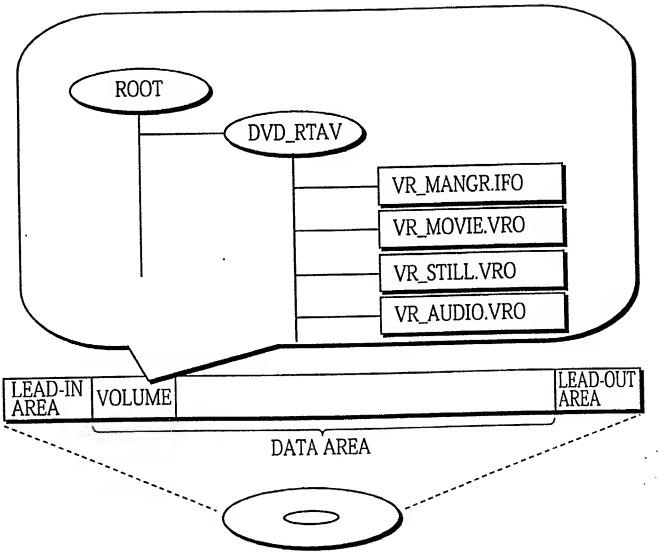

ROOT
DVD_RTAV
VR_MANGR.IFO
VR_MOVIE.VRO
VR_STILL.VRO
VR_AUDIO.VRO
LEAD-IN AREA
VOLUME
LEAD-OUT AREA
DATA AREA

FIG. 3

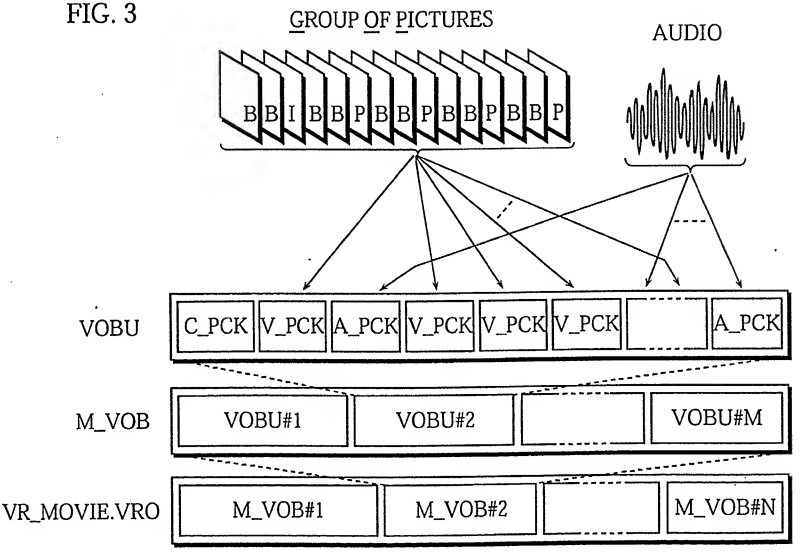
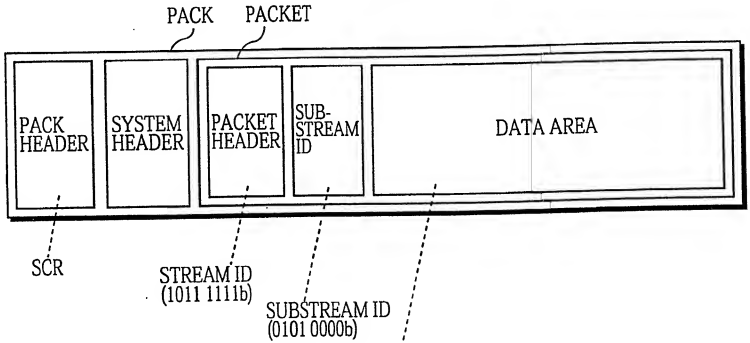
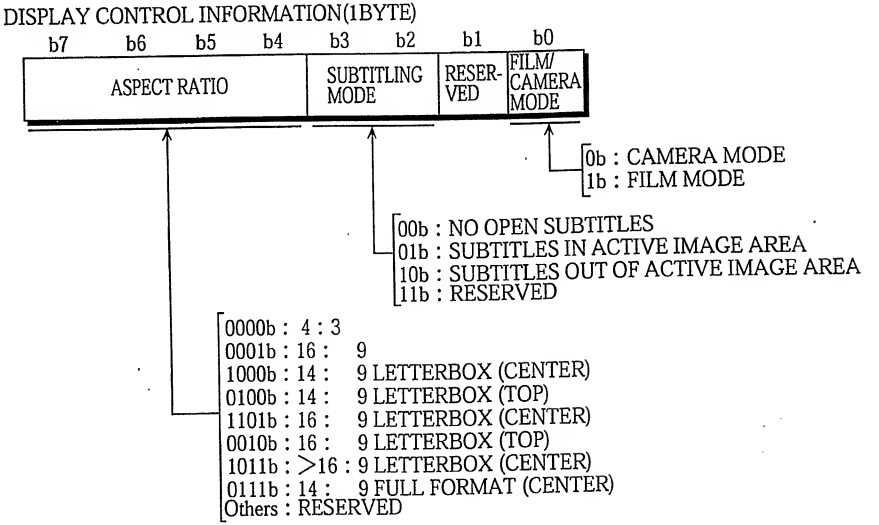

GROUP OF PICTURES
AUDIO
B B I B B P B B P B B P B B P
VOBU
C_PCK
V_PCK
A_PCK
V_PCK
V_PCK
V_PCK
A_PCK
M_VOB
VOBU#1
VOBU#2
VOBU#M
VR_MOVIE.VRO
M_VOB#1
M_VOB#2
M_VOB#N

FIG. 4



DCI_CCI_SS	STATUS OF DCI AND CCI	1BYTE
DCI	DISPLAY CONTROL INFORMATION	1BYTE
CCI	COPY CONTROL INFORMATION	1BYTE

FIG. 5


DISPLAY CONTROL INFORMATION(1BYTE)
b7
b6
b5
b4
b3
b2
b1
b0
ASPECT RATIO
SUBTITLING MODE
RESER-VED
FILM/ CAMERA MODE
0b : CAMERA MODE
1b : FILM MODE
00b : NO OPEN SUBTITLES
01b : SUBTITLES IN ACTIVE IMAGE AREA
10b : SUBTITLES OUT OF ACTIVE IMAGE AREA
11b : RESERVED
0000b : 4 : 3
0001b : 16 : 9
1000b : 14 : 9 LETTERBOX (CENTER)
0100b : 14 : 9 LETTERBOX (TOP)
1101b : 16 : 9 LETTERBOX (CENTER)
0010b : 16 : 9 LETTERBOX (TOP)
1011b : >16 : 9 LETTERBOX (CENTER)
0111b : 14 : 9 FULL FORMAT (CENTER)
Others : RESERVED

20h02d' 8E59800T

FIG. 6

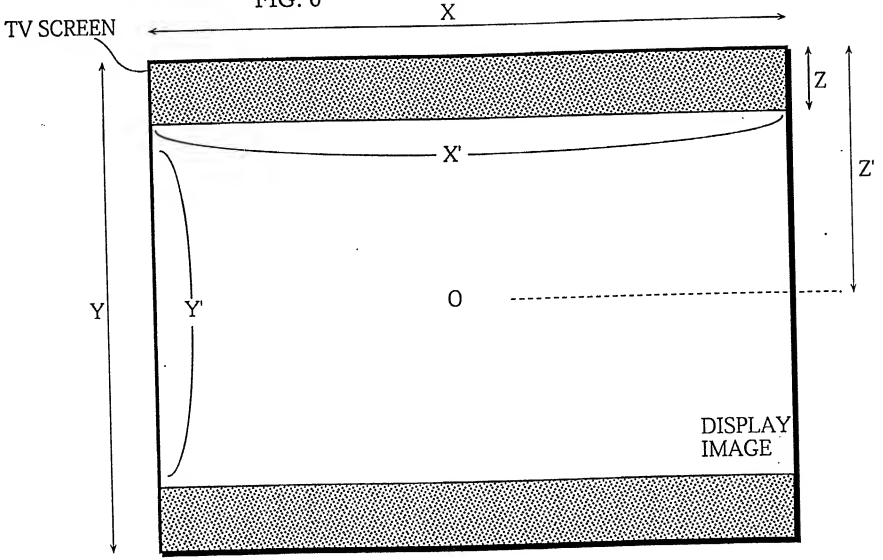


FIG. 7

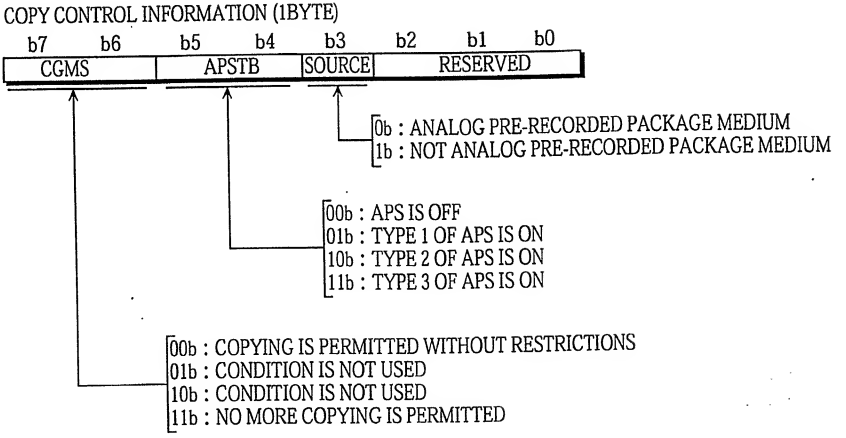

COPY CONTROL INFORMATION (1BYTE)
b7
b6
b5
b4
b3
b2
b1
b0
CGMS
APSTB
SOURCE
RESERVED
0b : ANALOG PRE-RECORDED PACKAGE MEDIUM
1b : NOT ANALOG PRE-RECORDED PACKAGE MEDIUM
00b : APS IS OFF
01b : TYPE 1 OF APS IS ON
10b : TYPE 2 OF APS IS ON
11b : TYPE 3 OF APS IS ON
00b : COPYING IS PERMITTED WITHOUT RESTRICTIONS
01b : CONDITION IS NOT USED
10b : CONDITION IS NOT USED
11b : NO MORE COPYING IS PERMITTED

FIG. 8

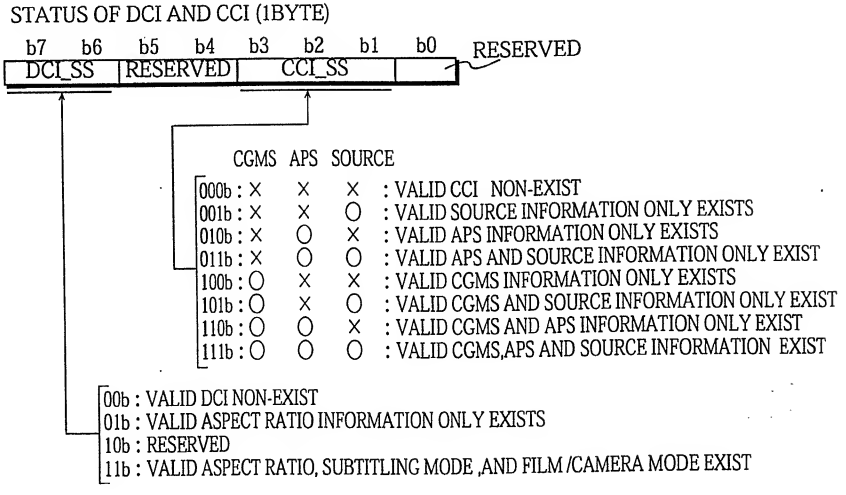

STATUS OF DCI AND CCI (1BYTE)
b7 b6 b5 b4 b3 b2 b1 b0
DCI_SS
RESERVED
CCI_SS
RESERVED
CGMS APS SOURCE
000b : X X X : VALID CCI NON-EXIST
001b : X X O : VALID SOURCE INFORMATION ONLY EXISTS
010b : X O X : VALID APS INFORMATION ONLY EXISTS
011b : X O O : VALID APS AND SOURCE INFORMATION ONLY EXIST
100b : O X X : VALID CGMS INFORMATION ONLY EXISTS
101b : O X O : VALID CGMS AND SOURCE INFORMATION ONLY EXIST
110b : O O X : VALID CGMS AND APS INFORMATION ONLY EXIST
111b : O O O : VALID CGMS,APS AND SOURCE INFORMATION EXIST
00b : VALID DCI NON-EXIST
01b : VALID ASPECT RATIO INFORMATION ONLY EXISTS
10b : RESERVED
11b : VALID ASPECT RATIO, SUBTITLING MODE ,AND FILM /CAMERA MODE EXIST

FIG. 9A

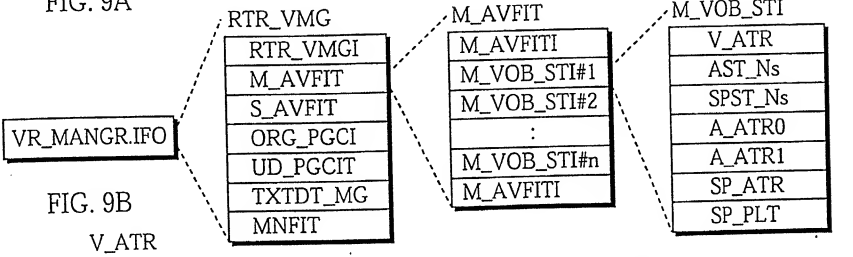


FIG. 9B

V_ATR

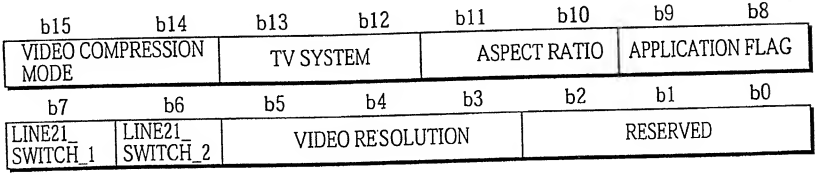


FIG.9C

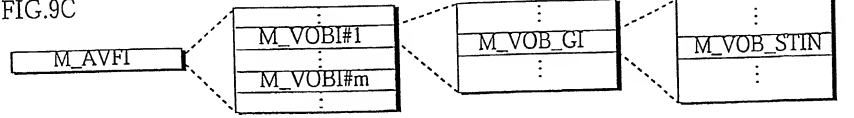


FIG. 10

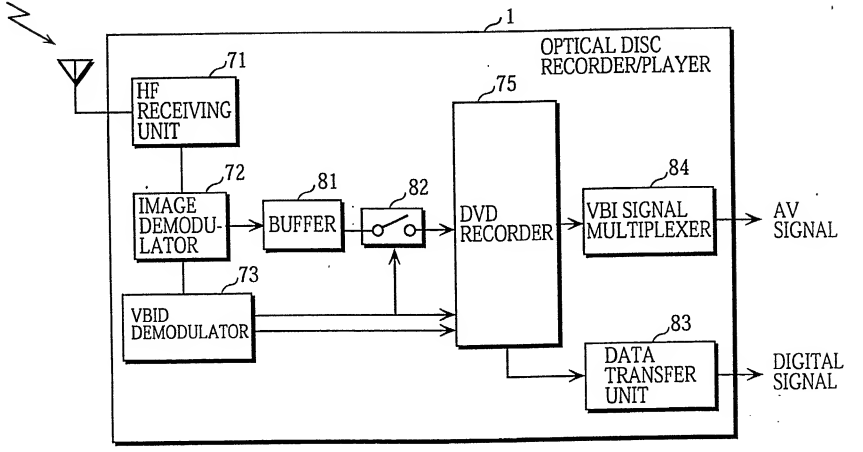

1
OPTICAL DISC RECORDER/PLAYER
71
HF RECEIVING UNIT
72
IMAGE DEMODU-LATOR
73
VBID DEMODULATOR
81
BUFFER
82
75
DVD RECORDER
84
VBI SIGNAL MULTIPLEXER
AV SIGNAL
83
DATA TRANSFER UNIT
DIGITAL SIGNAL

FIG. 11

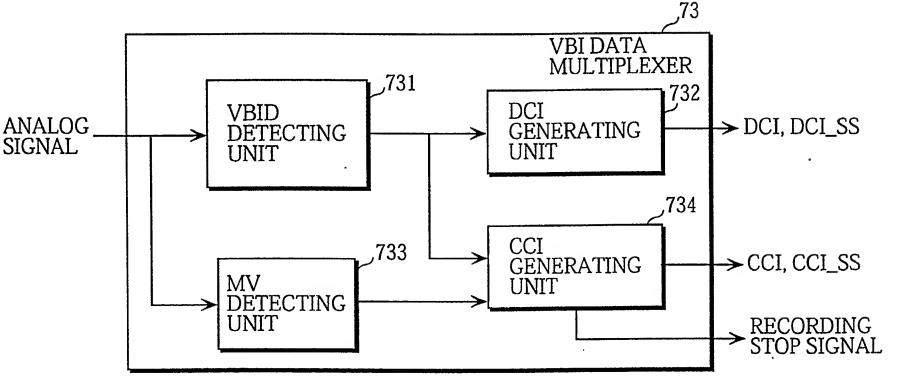

73
VBI DATA MULTIPLEXER
ANALOG SIGNAL
VBID DETECTING UNIT
731
DCI GENERATING UNIT
732
DCI, DCI_SS
MV DETECTING UNIT
733
CCI GENERATING UNIT
734
CCI, CCI_SS
RECORDING STOP SIGNAL

FIG. 12

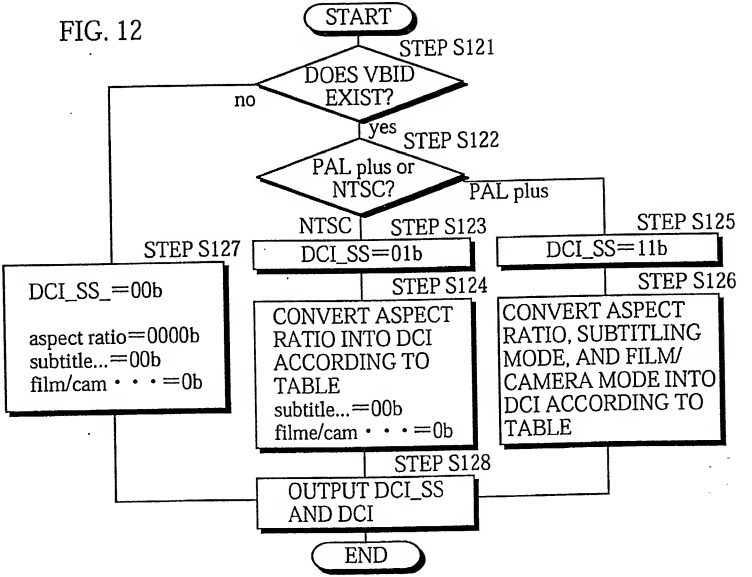

START
STEP S121
DOES VBID EXIST?
no
yes
STEP S122
PAL plus or NTSC?
PAL plus
NTSC
STEP S123
DCI_SS=01b
STEP S125
DCI_SS=11b
STEP S127
DCI_SS_=00b
aspect ratio=0000b
subtitle...=00b
film/cam • • • =0b
STEP S124
CONVERT ASPECT RATIO INTO DCI ACCORDING TO TABLE
subtitle...=00b
filme/cam • • • =0b
STEP S126
CONVERT ASPECT RATIO, SUBTITLING MODE, AND FILM/ CAMERA MODE INTO DCI ACCORDING TO TABLE
STEP S128
OUTPUT DCI_SS AND DCI
END

FIG. 13

NTSC "ASPECT RATIO" CONVERSION TABLE

b1	b2	MEANING	DCI(ASPECT RATIO)
0	0	4 : 3	0000b
0	1	16 : 9 LETTERBOX	1101b
1	0	16 : 9	0001b
1	1	UNDEFINED	(DCI_SS=00b)

FIG. 14

PAL plus "ASPECT RATIO" CONVERSION TABLE

b3	b2	b1	b0	MEANING	DCI(ASPECT RATIO)
1	0	0	0	4 : 3	0000b
0	0	0	1	14 : 9 LETTERBOX(CENTER)	1000b
0	0	1	0	14 : 9 LETTERBOX(TOP)	0100b
1	0	1	1	16 : 9 LETTERBOX(CENTER)	1101b
0	1	0	0	16 : 9 LETTERBOX(TOP)	0010b
1	1	0	1	>16 : 9 LETTERBOX(CENTER)	1011b
1	1	1	0	14 : 9	0111b
0	1	1	1	16 : 9	0001b

20020"8559801

FIG. 15

"SUBTITLING MODE" CONVERSION TABLE

b9	b10	MEANING	DCI(SUBTITLE)
0	0	NO SUBTITLES	00b
0	1	SUBTITLE IN ACTIVE IMAGE AREA	01b
1	0	SUBTITLE OUT OF ACTIVE IMAGE AREA	10b
1	1	UNDEFINED	00b

FIG. 16

"FILM/CAMERA MODE" CONVERSION TABLE

b4	MEANING	DCI(film/camera)
0	CAMERA MODE	0b
1	FILM MODE	1b

FIG. 17

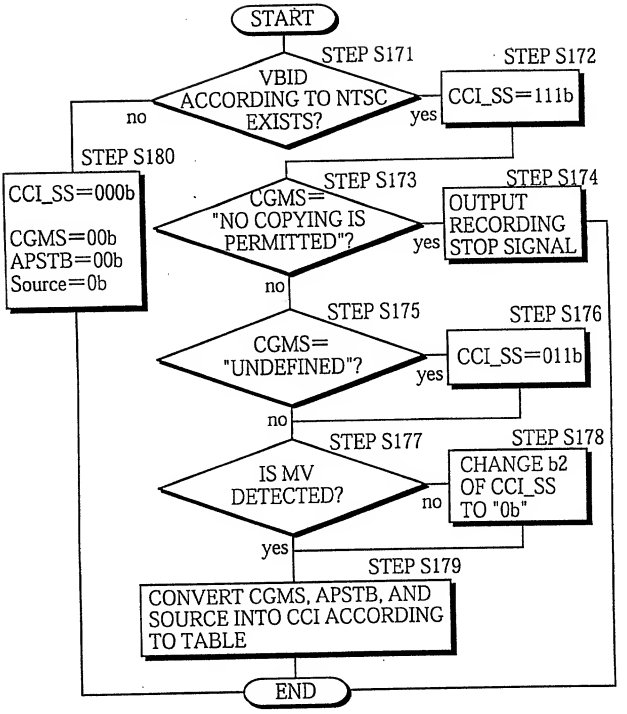

START
STEP S171
VBID ACCORDING TO NTSC EXISTS?
no
yes
STEP S172
CCI_SS=111b
STEP S180
CCI_SS=000b
CGMS=00b
APSTB=00b
Source=0b
STEP S173
CGMS= "NO COPYING IS PERMITTED"?
yes
STEP S174
OUTPUT RECORDING STOP SIGNAL
no
STEP S175
CGMS= "UNDEFINED"?
yes
STEP S176
CCI_SS=011b
no
STEP S177
IS MV DETECTED?
no
STEP S178
CHANGE b2 OF CCI_SS TO "0b"
yes
STEP S179
CONVERT CGMS, APSTB, AND SOURCE INTO CCI ACCORDING TO TABLE
END

FIG. 18

"CGMS" CONVERSION TABLE

b7	b8	MEANING	CCI(CGMS)
0	0	COPY IS PERMITTED	00b
0	1	UNDEFINED	01b
1	0	FIRST-GENERATION COPY IS PERMITTED TO BE GENERATED	11b(COPYING IS PROHIBITED)
1	1	COPYING IS PROHIBITED	(RECORDING STOP INSTRUCTION OUTPUTTED)

FIG. 19

"APSTB" CONVERSION TABLE

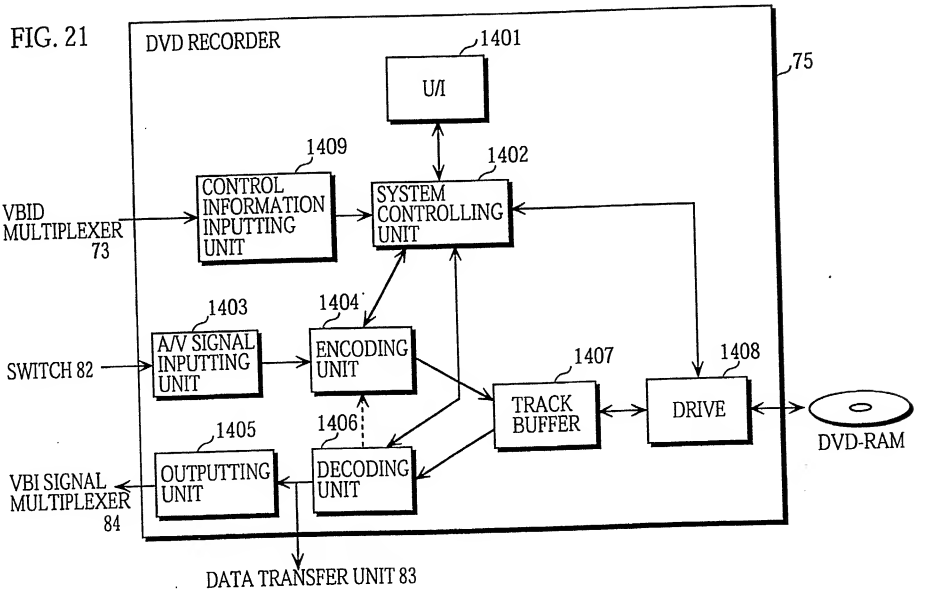
b9	b10	MEANING	CCI(APSTB)
0	0	NEITHER AGC PULSE NOR COLORSTRIPE OPERATION	00b
0	1	AGC PULSE IS VALID, BUT NO COLORSTRIPE OPERATION	01b
1	0	VALID AGC PULSE AND COLORSTRIPE OPERATION 2L MODE	10b
1	1	VALID AGC PULSE AND COLORSTRIPE OPERATION 4L MODE	11b

FIG. 20

"SOURCE" CONVERSION TABLE

b11	MEANING	CCI(Source)
1	ANALOG PRE-RECORDED MEDIA	0b
0	OTHERS	1b

FIG. 21


DVD RECORDER
75
1401
U/I
1409
CONTROL INFORMATION INPUTTING UNIT
1402
SYSTEM CONTROLLING UNIT
VBID MULTIPLEXER 73
1403
A/V SIGNAL INPUTTING UNIT
1404
ENCODING UNIT
SWITCH 82
1407
TRACK BUFFER
1408
DRIVE
DVD-RAM
1405
OUTPUTTING UNIT
1406
DECODING UNIT
VBI SIGNAL MULTIPLEXER 84
DATA TRANSFER UNIT 83

EP 0 820 198 A2

FIG. 22

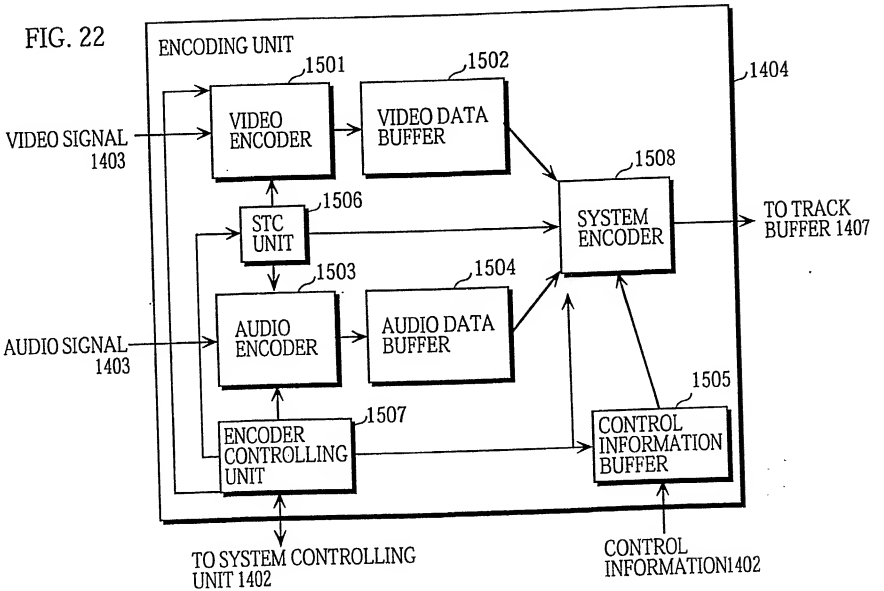


FIG. 23

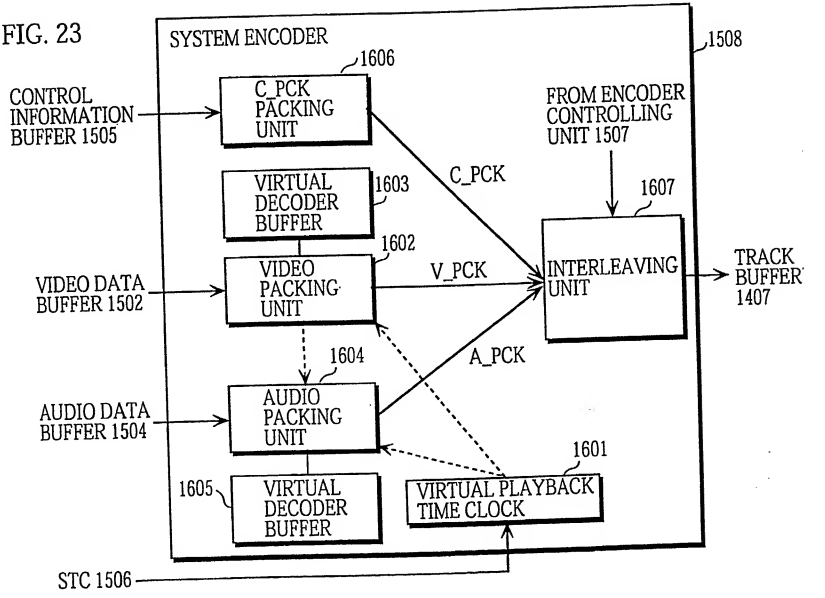
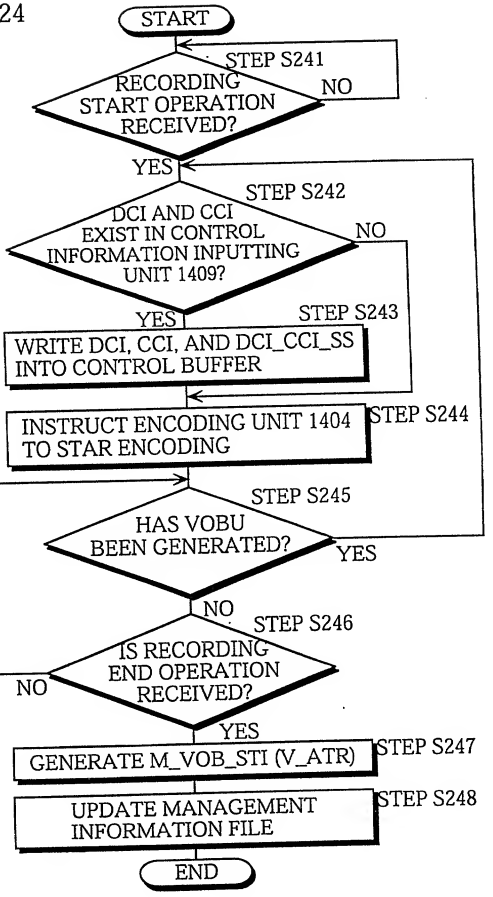
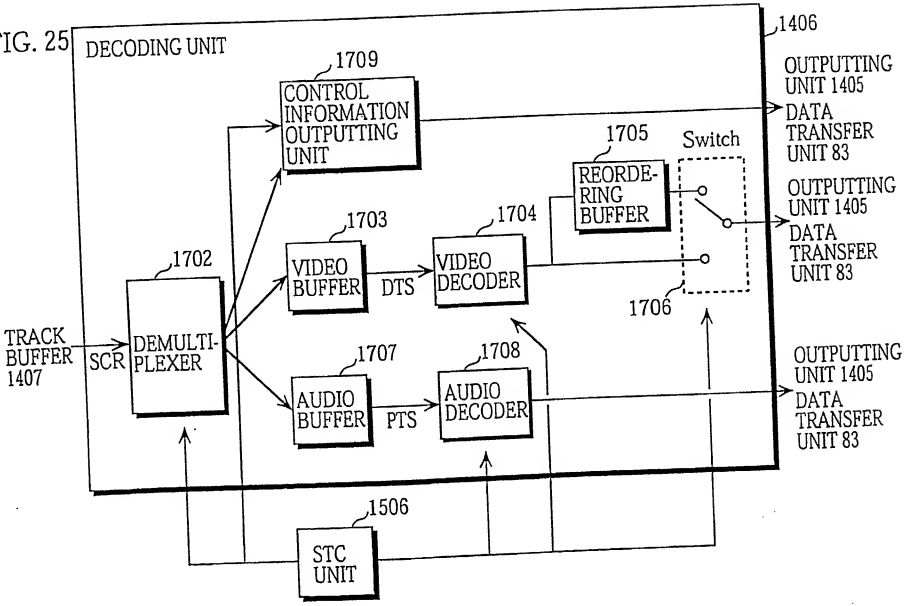

SYSTEM ENCODER
1508
1606
C_PCK PACKING UNIT
CONTROL INFORMATION BUFFER 1505
FROM ENCODER CONTROLLING UNIT 1507
C_PCK
VIRTUAL DECODER BUFFER
1603
1607
1602
VIDEO PACKING UNIT
VIDEO DATA BUFFER 1502
V_PCK
INTERLEAVING UNIT
TRACK BUFFER 1407
1604
A_PCK
AUDIO PACKING UNIT
AUDIO DATA BUFFER 1504
1601
1605
VIRTUAL DECODER BUFFER
VIRTUAL PLAYBACK TIME CLOCK
STC 1506

FIG. 24



20020828001

FIG. 25


DECODING UNIT
1406
1709
CONTROL INFORMATION OUTPUTTING UNIT
OUTPUTTING UNIT 1405
DATA TRANSFER UNIT 83
1705
Switch
REORDE-RING BUFFER
OUTPUTTING UNIT 1405
DATA TRANSFER UNIT 83
1703
1704
VIDEO BUFFER
DTS
VIDEO DECODER
1702
1706
TRACK BUFFER 1407
SCR
DEMULTI-PLEXER
1707
1708
AUDIO BUFFER
PTS
AUDIO DECODER
OUTPUTTING UNIT 1405
DATA TRANSFER UNIT 83
1506
STC UNIT